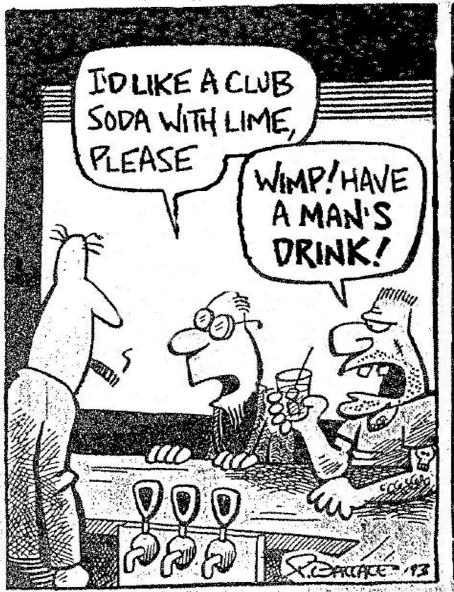
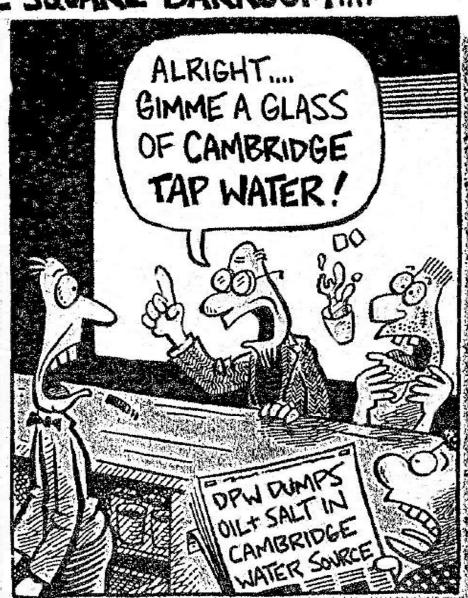
# CITOON

# ONE DAY IN A CENTRAL SQUARE BARROOM ....







# PRESENTATION OUTLINE

or....

Stuff I didn't know:

Where does our electricity come from?

Wholesale vs. Retail electricity

The cost of electricity – Description of a typical bill

What is meant by "Capacity Charge"

What are "Tag Day Demand" and "Demand" charges

What can be done to reduce Tag Day Demand and Demand Charges.

Stuff I do know about:

**Overview of the Cambridge Water Department** 

**Sub Metering example.** 

What else is Cambridge Water Department doing about reducing energy use.

# Our source of electricity comes from ISO-NE

## What is ISO-NE?

ISO New England (ISO-NE) helps protect the health of New England's economy and the well-being of its people by ensuring the constant availability of electricity, today and for future generations. ISO New England meets this obligation in three ways: by ensuring the day-to-day reliable operation of New England's bulk power generation and transmission system, by overseeing and ensuring the fair administration of the region's wholesale electricity markets, and by managing comprehensive, regional planning processes.

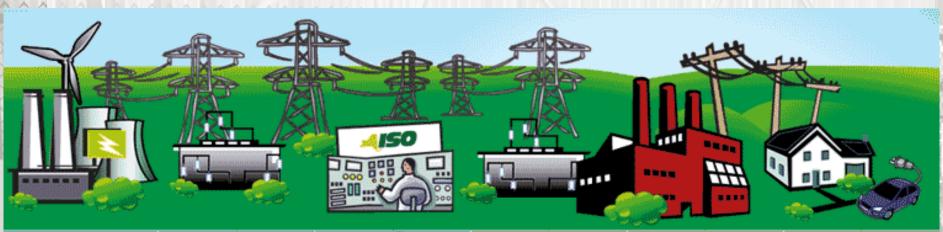
## What is ISO?

ISO (International Organization for Standardization) is the world's largest developer of voluntary International Standards. International Standards give state of the art specifications for products, services and good practice, helping to make industry more efficient and effective. Developed through global consensus, they help to break down barriers to international trade.

ISO is not an acronym. ISO is Greek for equal.

#### Wholesale vs. Retail Electricity

The ISO-NE administers the wholesale power market for New England. Wholesale power is accessible only from the high-voltage system, at quantities larger than one megawatt. While the ISO-NE is not involved in the retail market for electricity, the companies that provide retail electricity (utilities and energy service companies, for example) procure power through the ISO-NE's wholesale electricity markets.



1

#### **Generating Station**

Electricity is typically generated by a steam or hydro-driven turbine at the power plant.

COPYRIGHT NYISO

2

#### Step-Up Transformer

The power is then ramped up to high voltage for long-distance transmission.

3

#### Transmission

Next, a series of highvoltage lines transmit the electricity through the power grid. 4

#### Step-Down Transformer

Power is then reduced to a lower voltage for use in homes and businesses. 5

#### Subtransmission Customer

The electricity then passes through a series of switches to distribution lines. 6

#### Customers

Power is then delivered to customers via local lines.

WHOLESALE

RETAIL

DAF BASIN #1

### The Cost Of Electricity

The various components of wholesale electricity prices include energy costs as measured by Locational Based Marginal Price (LBMP), and other charges such as Transmission Adjustment Charge, Reserve, Regulation, ISO-NE Cost of Operation, Uplift, Voltage Support and Black Start.

### **Components of Wholesale Electricity**

- ➤ Locational Based Marginal Price (LBMP): equal to the cost of energy production plus the transportation (losses and congestion) cost.
- ➤ Transmission Adjustment Charge: flat per Mega Watt (MW) charge to compensate the ISO-NE for transmission system operation and maintenance
- ➤ **Reserve**: market-based payment to generators providing short-term (10 and 30 minute) reserve power .
- ➤ **Regulation**: market-based payment to generators helping to maintain frequency in real-time.
- ➤ ISO-NE Cost of Operation: flat per Megawatt (MW) fee to cover the cost of operating the ISO-NE.
- **➤ Uplift**: charge for resources that must be committed outside of market mechanism.
- ➤ **Voltage Support**: flat per MegaVolt-Amphere reactive (MVAr) payment to generators with the ability to maintain voltage.
- ➤ Black-Start: cost-based payment to generators with the ability to restart after a black-out

#### **Components of Retail Electricity**

From the Supplier – Example TransCanada
Wholesale cost of electricity – Price per Kilowatt/hour (kWh)
Congestion Charge
Daily Ready, Must Run (RMR) Charge
Capacity Charge – derived from Tag Day Demand, a single point in a year

From the Delivery Company – Example NSTAR Demand Charges

Distribution Charge Transmission charge Transition charge

**Total Demand Charge** – *derived from a fixed period* – *30 day window* 

Peak Charges, Low A Charges, Low B Charges

Distribution

Transition

Renewable Energy

**Energy Conservation** 

# 2006 – City Finance Department consultant recommendations to target "Tag Day Demand Reductions" on all municipal electricity accounts.

Although some components of your organization's electricity bill are fixed, There are components the user can influence. Users have the ability to reduce *capacity* charges for an entire year by taking simple actions for only a few hours during the summer.

#### What is a capacity charge?

In deregulated electricity markets, there are two main products: electricity; and capacity. Capacity can be viewed as a call option on electricity where a peaking resource is paid just to be on standby in the event that it's needed.

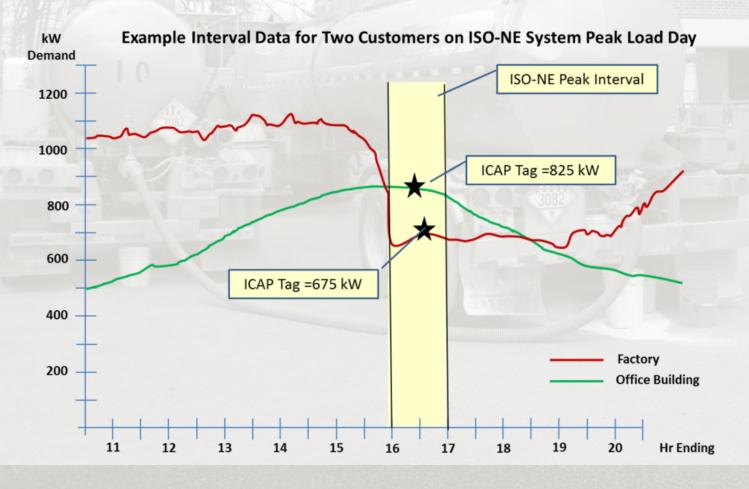
To ensure there is adequate electricity available to meet peak demand each year the cost of building and maintaining electrical generation capacity each end user is assessed a *capacity* charge or *Installed Capacity* (*ICAP* )charges or *Unforced Capacity* (*UCAP*)charges or embedded in a completely different line item.



# **How Tag Day Demand Charges are selected:**

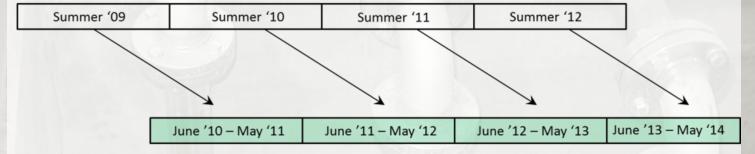
Any customer with an interval meter is assigned an Installed Capacity Tag (ICAP) based on their demand during the ISO-NE annual system peak hour.

# **Customer ICAP Tag Determination**



## ICAP Tags Take Effect With a One Year Lag

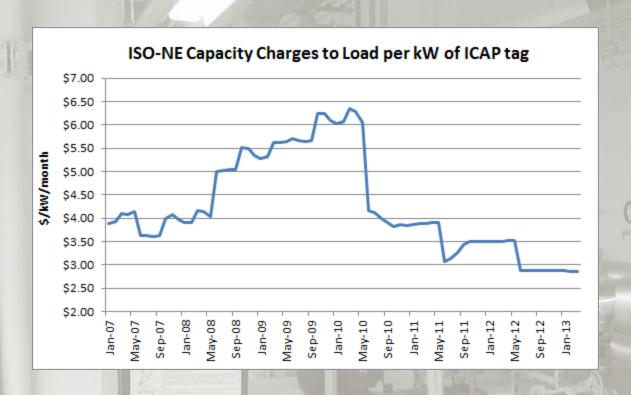




**Customer Payment Period** for Associated ICAP Tag

For many end use customers buying energy competitively in New England, treating capacity charges as a "pass through" item in the contract could lead to a significant cost savings opportunity. Capacity prices are set during the ISO-NE Forward Capacity Market (FCM) auction, but they change slightly from month to month based on the reserve margin and other factors that determine ultimate charges to load.

The graph below shows historical capacity charges in the ISO-NE market.



End use customers can take control of this charge by reducing their afternoon demands on the hottest days of the year or by working with an energy service company that warns customers when peak load hours are likely to occur so they can initiate demand response procedures.

Presently, <u>Constellation</u> and <u>Tangent</u> both offer such services in ISO-NE although there are some significant differences in how they bill customers for the service.

# Here's how a NSTAR Demand Charge can affect your bill.

If you consumed 15,000 kWh of electricity during the month, your usage charges might look like this:

Delivery Charges (per kWh) 8.6 cents x 15,000 kWh = \$1,290 Generation Charges (per KWh) 8.0 cents x 15,000 kWh = \$1,200 Total Usage Charges = \$2,490

The demand charge captures the moment you had the most items turned on at once. Let's assume your peak demand was registered at 60 kW this month. Peak demand only a snapshot of energy consumed it is measured in kilowatts (kW) versus energy consumed over time which is measured in kilowatt-hours (kWh). Your Demand Charge would be as follows:

Peak Demand 60 kW 1st 10 kW is free -10 kW Adjusted Peak 50 kW Demand Charge (per kW) \$4.86 x 50 kW = \$243

Although energy consumption is clearly the major part of the energy expense, the Demand Charge (equal to 10% of the total energy bill in this case) is controllable and should be part of the overall energy strategy.

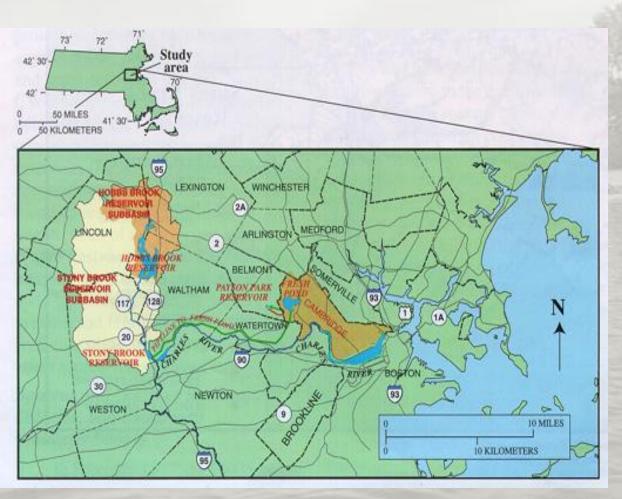
# NSTAR electric meters automatically record the peak level of energy demand during every month.

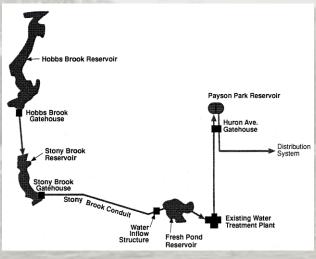
The idea behind a Demand Charge is that the utility must have enough energy available to satisfy your peak demand at any given time. You won't always be using your peak, but they must have it available, just in case. The Demand Charge is a way to offset the cost of the providing this just-in-case energy.

# **SO.... To minimize NSTAR Demand Charges?**

Change the way you are using energy during peak periods.

# Cambridge Water System







# **Treatment Facility Site**

The City purchased the Water Works in 1864





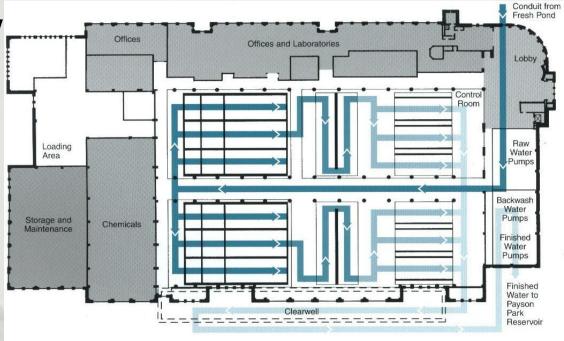
1924

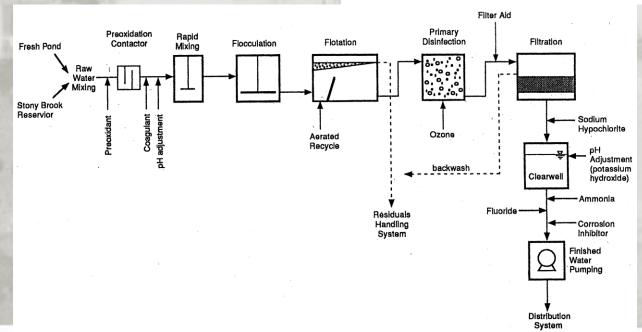




2001

# **Process Flow**







# An example of a TransCanada bill:

	Туре		kWh	Rate	Amount	Totals				
CUSTOMER ACCT: 11498860060 - City Of Cambridge Wtr Dpt - Average Total Price = 0.091121										
Service from 04/24/20	013 to 05/23/2013 (29 days)									
Contract Price	On-peak (Actual)		139,759	0.0864	\$12,075.18					
	Off-peak (Actual)		361,856	0.0864	\$31,264.36					
	Shoulder (Actual)		111,105	0.0864	\$9,599.47					
	Contract Price Sub-tota	l -	612,720	_	\$52,939.01	\$52,939.01				
Congestion Charge			612,720		\$0.00	\$0.00				
Daily RMR Charge			612,720	0.000065	\$39.83	\$39.83				
Capacity Charge	Current Capacity	04/24/2013 to 05/23/2013 (29 days)	1	2,853.0168	\$2,853.02	\$2,853.02				
Sub-total CUSTOMER ACCT: 11498860060			TCIR: CAMBRII	OGEMA 101		\$55,831.86				

**Monthly Tag Day Capacity Charge 5% of bill** 

# An example illustrating Demand charges on an NSTAR Bill:

TOTAL KWH		6 12720	TOTAL KWH	CHARGE	8,126.78
ENERGY CONSERVATION	0.002500	X 361856	KWH = _	904.64	
RENEWABLE ENERGY	0.000500	X 361856	KWH =	180.93	
TRANSITION	-0.001720	X 361856	KWH =	-622.39	
DISTRIBUTION	0.011983	X 361856	KWH =	4,336.28	
LOW B CHARGES:					
ENERGY CONSERVATION	0.002500	X 111105	KWH =	277.76	
RENEWABLE ENERGY	0.000500	X 111105	KWH =	55.55	
TRANSITION	-0.001720	X 111105	KWH =	-191.10	Charges!
DISTRIBUTION	0.011983	X 111105	KWH =	1,331.42	
LOW A CHARGES:					Demand
CHENOT CONSERVATION	0.002,000	W 133133	12411 -	349,40	
ENERGY CONSERVATION	0.002500	X 139759	KWH =	349.40	59% of this bill is
RENEWABLE ENERGY	0.000500	X 139759	KWH =	69.88	
TRANSITION	-0.001720	X 139759	KWH =	-240.39	the state of the state of the
PEAK CHARGES: DISTRIBUTION	0.011983	X 139759	KWH =	1,674.80	1500 - 1914
TOTAL DEMAND		1100.0 KV	TOTAL DEMA	ND CHARGE	11,750.25
TRANSMISSION CHARGE	5.01 X	1100.0 KV/	=	5,513.25	
	1.74 X	1100.0 KV/	-	1,917.00	
TRANSITION CHARGE					
DEMAND CHARGES: DISTRIBUTION CHARGE	3.92 X	1100.0 KV/	-	4.320.00	
CUSTOMER CHARGE					90.00
DELIVERY SERVICES					Caracina

10 MGD Finish Water Pumps 400 H.P. Variable Speed Drive



# 10 MGD 100 H.P. Raw Water Pumps



CWD has two sources of power. Electrical power is supplied to the site by two separate 13.8 KV, 3 phase, 60 Hertz incoming lines from NSTAR Electric, (Incoming Line No. 1 and Incoming Line No. 2). Power is routed through 15 KV load interrupter switchgear through two 3000KVA, 13.8 KV -480V, 3 phase, 4 wire transformers (T-1 and T-2) which supply the two 4000 amp, 480 V, 3 phase, 3 wire busses (Bus A and Bus B).









3710 ACM A digital 3-phase Power Instrumentation Package



### **Metering Capabilities**

- ✓ Instantaneous
- ✓ Energy
- ✓ Minimums Maximums
- ✓ Logging & Recording
- √ Historical Logging
- ✓ Max/Min Logging
- ✓ Event Logging & Recording
- ✓ Waveform Capture

# Communications Ports Software Integration SCADA Software

# Measurement Specifications

Parameter	Accuracy <sup>‡</sup> ±(% full scale)	Resolution	Range	
Voltage	0.2 %	0.1 %	0-999,999*	
Current(see op tions)	0.2 %	0.1 %	0 - 30,000	
Nieut/Grid Culirent	0.2 %	0.1 %	0-9,999	
kVV (& demand )	0.4 %	0.1 %	0 - 99 9,99 9†	
kVAR (& de man d)	0.4 %	0.1 %	0-999,999†	
kVA (& demand)	0.4 %	0.1 %	0-999,999†	
PowerFactor	1.0 %	1.0 %	-0.6to1.0to+0.6	
Frequency	0.2 Hz	0.1 Hz	50, 60, 40 OHz	
kt/Uh	0.4 %	1 kWh	0 -99 9,999,999	
kvann	0.4 %	1 kVARh	0 -99 9,999,999	
kVAh	0.4 %	1 KVAh	0 -99 9,999, 999	
Vac (1 VAC scale)	0.25 %	0.1 %	0 - 999, 999	

Reads in KV for voltages over 9,999. PReads in NO, MAR, MAA for readings over 9,999 k.

#### Waveform Capture & Recording

Samp	- mg 14223	Accuracy	Resolution
Ota veform Capture 8 kH a	z <sup>†</sup> (128 times <i>l</i> cycle)	2 % of full scale	10 bits (0.1 %)

<sup>&</sup>lt;sup>r</sup> Approximate

#### User Programmable Log Capacity

#### Example configurations

Parametens per log	Interval	Capacity per Log
12 with 3710 ACM	15 minutes	25 hours

<sup>&#</sup>x27;@50.0 Haor@60.0 Hac@ 25 C/77 F.

# **CWD Power Monitoring System**

A microprocessor based metering system is integrated into the plant's electrical distribution system.

The monitoring system is composed of circuit monitors located at each switchgear main, feeder and tie circuit breakers (including the switchboard main circuit breakers), a programmable logic controller (PLC) located at each substation and switchboard, an IBM compatible personal computer workstation (central monitoring station) located at the Central Control Room in the Operations Building, and a data highway network linking all the substation PLCs to the central monitoring station.

Each circuit monitor is a multifunction, digital instrumentation, data acquisition and control device. The circuit monitor instrumentation capabilities offer:

#### Real-time readings of:

- Per phase, neutral, ground and three phase current
- Line to line and line to neutral voltage
- •Per phase and three phase real power (W), reactive power (VAR) and apparent power (VA)
- Per phase and three phase power factor
- Frequency
- Current and voltage total harmonic distortion
- Per phase K-factor;

### **Demand readings of:**

- Per phase present and peak demand current
- •Three phase total average power factor
- •Three phase total real power (W), reactive power (VAR) and apparent power (VA)
- Coincident readings
- Predicted readings;

## **Energy readings of:**

- •Real (W), reactive (VAR) and apparent (VA) accumulated energy
- •Bi-directional readings; and Power analysis values of:
- Per phase crest factor
- •Per phase K-factor demand
- Per phase and three phase displacement power factor
- Per phase fundamental voltages and currents
- Per phase fundamental real power (W) and reactive power (VAR)
- Harmonic power
- Current and voltage unbalance
- Phase rotation
- Per phase harmonic magnitudes and angles.

All the information indicated above is stored locally at each circuit monitor and is also transmitted to the central monitoring system for system performance, peak demand reporting of the entire plant or portions as desired by the operator.

In addition, each circuit monitor is furnished with an input/ output module for each circuit breaker. Circuit breaker status (OPEN, CLOSED, TRIPPED and OUT OF SERVICE) is monitored by each circuit monitor and the information transmitted to the central monitoring station for event log reporting or graphic display of plant wide circuit breaker status.

#### The following are stored locally at the circuit monitor in non-volatile memory:

- Time-stamped alarm and event logs.
- •Time-stamped minimum/maximum log, which records the value of any parameter exceeding the previous highest or lowest value recorded.
- •A time-stamped snapshot (historical) log, which records snapshot values for average voltage and current, real and reactive power, demand real power, power factor, frequency, real and reactive energy, reverse energy, and auxiliary voltage input.

All the circuit monitors are equipped with the identical features described above with the exception of each of the main device circuit monitors. The main device circuit monitors have an additional feature which is "waveform capture". These circuit monitors use a sophisticated, high-speed sampling technique to sample 64 times per cycle, simultaneously, on all current and voltage inputs.

Waveform capture is automatic if the circuit monitor detects an alarm assigned to this function or if manually initiated from the central monitoring station. As the circuit monitor samples the data every 4 cycles, it performs metering calculations and checks for alarm conditions. If during this process, an alarm is detected, then the circuit monitor saves the data from the beginning of the cycle. Only one waveform is stored in volatile memory. Waveform capture data shall be made accessible via the communications port.

The software implemented at the central monitoring station will permit the operator to view all phase voltage and current waveforms simultaneously, or zoom in on a single waveform that includes a data block with extensive harmonic data.

DISPLANT SE

The circuit monitors at each switchgear/switchboard are daisy chain connected from one circuit monitor to the other and finally terminated at the PLC by way of an RS-485 communication port. Each switchgear/switchboard PLC provides dual redundant network communications for the power monitoring system fiber optic data highway.

111 49 / 50 / 50

In addition for being the gateway communicator between the circuit monitors and the central monitoring station, each programmable logic controller has the following input/output capabilities:

- •Initiates automatic transfer controls.
- Receives UPS trouble alarm and transmits to the central monitoring station.
- •Receives power factor correction capacitor alarms and transmits to the central monitoring station.
- •Controls power factor correction capacitors by energizing and de-energizing banks as required to maintain the system power factor at the desired value.
- •Monitors substation and pad mount transformer temperature and transmits alarms to the central monitoring station.
- •Provides a loss of power signal to the process control and instrumentation central processing unit for load shedding.

All the information retrieved by either the circuit monitors or the PLCs terminate at the central monitoring station.

The central monitoring station is composed of a personal IBM personal computer, printer and power monitoring software.

The information compiled from the remote switchgear/switchboard devices are used to minimize energy usage, avoid peak demand levels and reduce system downtime.

All the information transmitted to the central monitoring station as described above is accessible from various windows.

Real-time metering can be viewed using bar charts or graphical analog metering.

All alarms are automatically entered in the event log, and the operator is immediately notified of any alarms.

## **Cambridge Water Department**

10/4/2006

Summary of electrical use for the twenty three day period September 11th to October 4, 2006

Assuming \$0.11 (\$0.08 demand + \$0.03 delivery) per Kilowatt hour

Each of the MCC's has a totalizer for Kilowatt hours (KWH).

MCC ID	Primary Process ID	Total Kilowatt Hours		Percent of total
MCC Pumps 1,2,3,4	High Lift Pumps	279,352	\$30,728.72	47.3
MCC PR 1+2	Raw and Backwash Pumps	93116	\$10,242.76	15.8
MCC OZ 1+2	Ozone Process and DAF Recycle pumps	71983	\$7,918.13	12.2
MCC DA 1+2	DAF and Pretreatment	27927	\$3,071.97	4.7
MCC RE	Residuals Handling	16111	\$1,772.21	2.7
MCC HV 1+2	HVAC	93918	\$10,330.98	15.9
MCC VS	Vehicle Storage Building	8094	\$924.33	1.4
			\$64,989.10	100.0

MCC = Motor Control Center

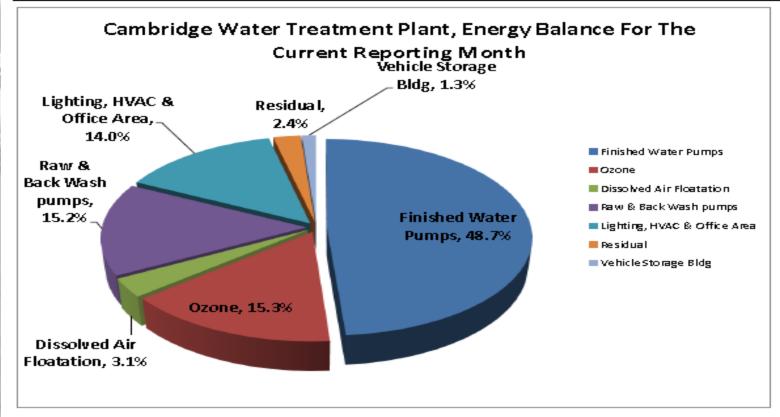
#### CAMBRIDGE WATER TREATMENT PLANT MONTHLY ENERGY REPORT





Electrical Energy Consumption for the Month of May-13
Data Generated From In House Electric Power Metering Equipments
Units in KWH

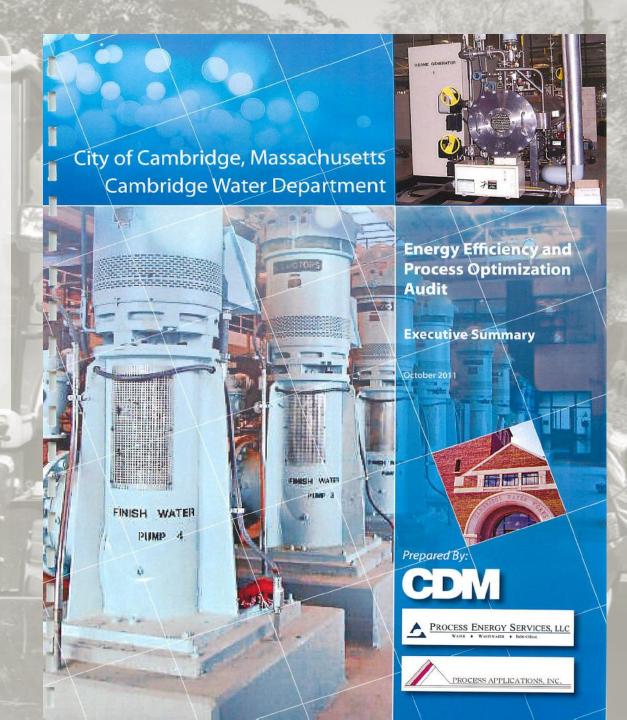
Read dates	Main	H⊓l∎l1ed Volater Pump∎	Ozone	D.A.F.	Raw & BA/ pum p ii	Lighting, HVAC& Office	Residual	VS Edg	PFUniti	Backup Ge⊓.
4/24/2013 - 5/23/2013	602535	307959	96546	19698	96139	88391	15126	7946	814	0



Report Prepared by Allan Cheung, Instrumentation and Maintenance Manager Cambridge Water Department, 250 Fresh Pond Parkway, Cambridge, MA 02460 Tel: 617-349-4783, email: acheung@cambridgema.gov

**CWD** entered into a contract with:

Camp, Dresser &
McKee/Smith,
Process Energy Services,
LLC. and Process
Applications, Inc. to audit
our facility to gain a better
understanding of where the
electricity is going and come
up with ways to optimize our
energy use.



# **Energy Efficiency and Process Optimization Audit Summary:**

The power consumption for finish water pumping eclipses any other treatment process or building system, so considerable focus was placed on identifying measures to optimize the finish water pumping operation.

The raw water pumping system as a whole has high frictional losses, resulting in poor overall efficiency. Several alternatives have potential annual savings of \$50,000 to \$75,000 annually.

CWD has undertaken several energy savings upgrades including window glazing films, lighting upgrades and others. Several energy savings measures were identified related to the building systems; however, other than boiler replacement, the annual savings are small compared to the savings that can be achieved with the pumping systems.

# The Energy Efficiency and Process Optimization Audit report produced an energy savings "Toolbox"

The toolbox concept recognizes that the CWD may choose to implement energy and process savings measures in a phased approach.

It also reflects the fact that some measures are mutually exclusive, and some measures can be combined for added savings beyond what can be realized from the sum of the individual measures.

The intent of the toolbox is to provide the CWD with broad flexibility to select energy savings strategies that consider the overarching goal of reliably ensuring high-quality water of sufficient quantity for city residents.

A key feature of the toolbox concept is the ability to "mix and match" many of the components to best accommodate the CWD's goals.

#### **CWD Proposed Energy Reduction projects**

Project	Project Cost \$	Annual Energy Savings in \$
Raw Water Pump Variable Speed Drives (VFD)	<b>5</b> 52,500	74,800
Process Improvements  No DEP permit or funding requirements		
Lower Payson Park Operating Level		3,464
Extend Filter Run Times		70,000
Filter return to service optimization		10,000
DEP permit required		
Disinfection Systems – design	100,000	25,000
LED Lighting	<mark>324,000</mark>	20,845
HVAC		
Chilled Water Pumps	29,500	3,500
Boiler replacement	1 <mark>4</mark> 4,000	25,200
Demand Reduction		
Modify High Lift Pump Operation		18,000
Modify Filter Backwash Operation		20,200
Modify Residual System Operation		12,000
Renewable Energy		
Solar Panels	450,000	14,000
TOTAL PROJECT COSTS	1,600,000	297,009

#### **Accomplishments to date:**

Energy Saving Measure: Replace two existing boilers with high efficiency condensing boilers.

Date implemented: Jan. 2013

Projected energy savings: Projected annual savings of 15600 therms and annual cost saving of \$25200.

Energy Saving Measure: **Reduce flow** to 10 MGD and operate on one raw water pump and one finished water **pump during NSTAR peak demand period.** 

Date implemented: Nov. 2011.

Projected energy savings: Savings of 335 KVA off the NSTAR demand charge, at \$10.5/KVA, monthly

savings = \$3518, KWH savings unavailable.

Projected demand cost savings per year: At \$10.5/KVA, Annual savings = \$20160.

Energy Saving Measure: Shut off residual and waste wash water system during NSTAR peak demand period.

Date implemented: Nov. 2011.

Projected energy savings: Savings of 24 KVA off the NSTAR demand charge.

Projected cost savings per year at \$0.11/kWh: At \$10.5/KVA, monthly savings = \$252.

Energy Saving Measure: **Upgrade process area lighting** to high efficiency T8 fluorescent light fixtures and install motion and light sensors thru out building.

Date implemented: Dec. 2008.

Projected energy savings: 473706 KWH/year.

Projected cost savings per year at \$0.11/kWh: \$52108 per year.

Energy Saving Measure: **Update HVAC computerized system** and **implemented** night time temperature

set back and holiday schedules.

Date implemented: Nov. 2008.

Projected energy savings: 39124 KWH/year, natural gas savings undetermined.

Projected cost savings per year at \$0.11/kWh: \$4303 per year.

#### What the Cambridge Water Department is doing to cut electrical costs:

The water department has committed 1.6 million dollars toward energy conservation.

But a lot can be done without any dollar cost or any loss of water quality or quantity, Such as:

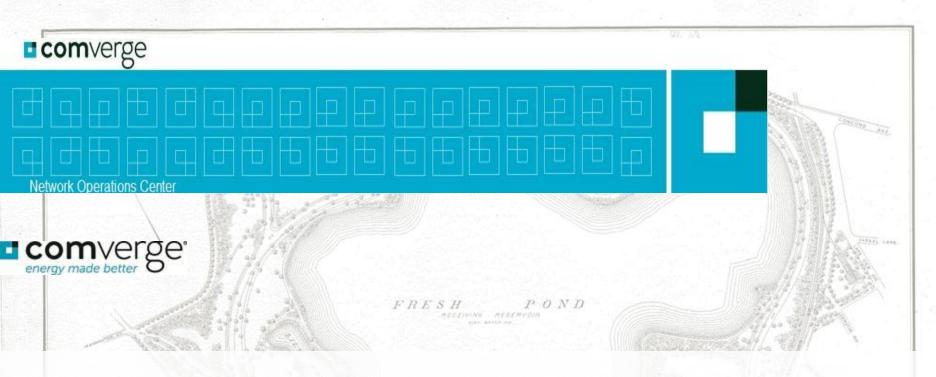
Ed Dowling initiated monthly reporting of sub meters and billing information. Presented monthly at each group staff meeting to raise awareness of where our electricity is going.

Shifting all intermittent operations out of peak demand periods.

The **operational decision** to limit finished water pump operations to two pumps during demand periods. We can run three. Raw Water Pump operation as well.

Optimizing the filter operation and filter backwash process.

**Demand Response.** During periods of high electrical use we get the call to curtail use. we can shut the plant down.



#### ATTENTION – ISO-NE HAS INITIATED A DEMAND RESPONSE EVENT FOR TODAY IN THE BOSTON REGION

It is mandatory that you decrease your electrical load immediately, and keep this load reduction in place until further notice from Comverge. Participants will be notified once the event has concluded.

If you have any questions during this Demand Response event please reply by e-mail to CommandCenter@Comverge.com or call (866) 925-0408 to reach a Comverge Command Center Operator who can assist you.

Thank you,

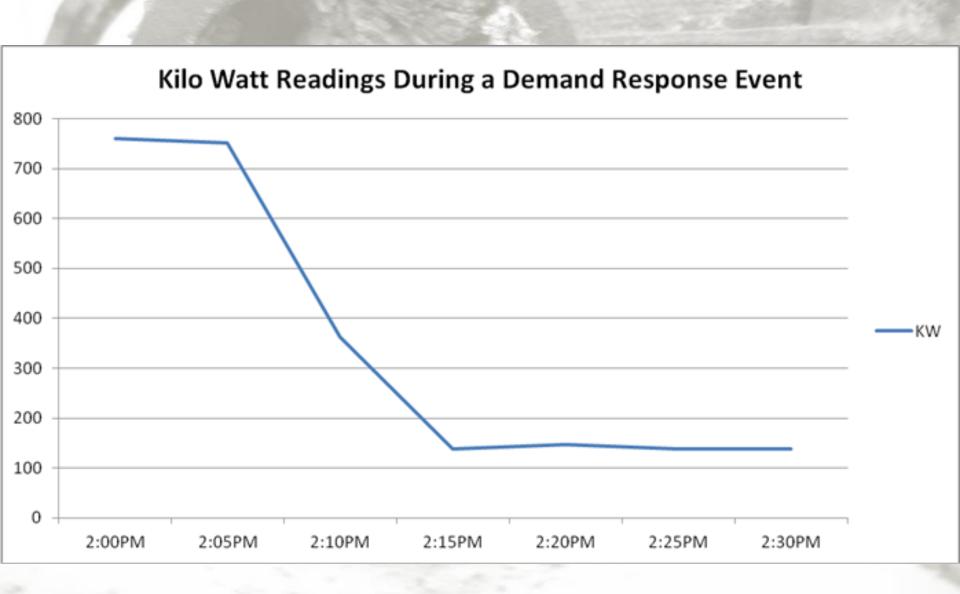
#### Comverge Command Center,

Comverge Inc.

p: 1.866.925.0408

commandcenter@comverge.com www.comverge.com

#### CWD Electrical use reduction during a demand response event.



## Welcome to Energy Manager

**Bulletin Board** 

News & Weather

**Usage Reports** 

Wholesale Markets

Exceptions

**Hourly Data** 

Alarms

Dist. Generation

**Cost Estimation** 

**Power Quality** 

Asset Tracking

Preferences

Help

Administration

Welcome!

Cambridge Water

**Usage Curves** 

Graphs and tables of your energy consumption for user defined period. Create a report on electric power and load factor.

**Customer Baseline** 

Calculate a baseline for a specific day.

Average Load

View actual load data against a user definable rolling average.

Compare Loads

Compare usage for multiple sites over different time periods. This page also offers more precision for smaller loads.

Usage Allocation

A spreadsheet style report summarizing the key energy measures for the time range selected.

Demand Profile

This report shows a given site's peak demand on a day by day basis, over the selected time range.

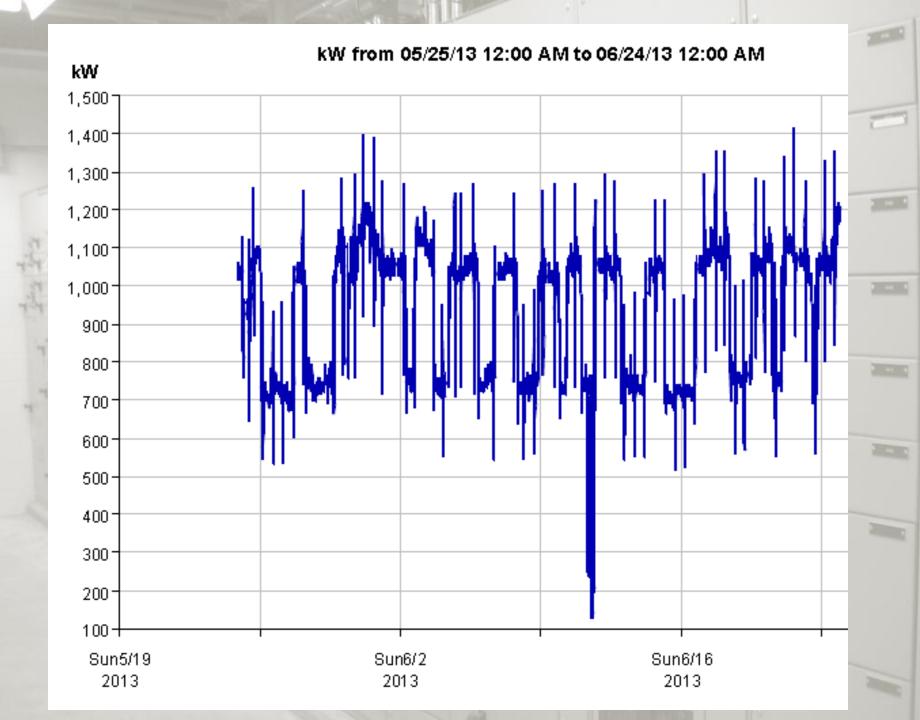
**Load Duration Curve** 

This report shows the percentage of time that a site's demand meets or exceeds a given level.

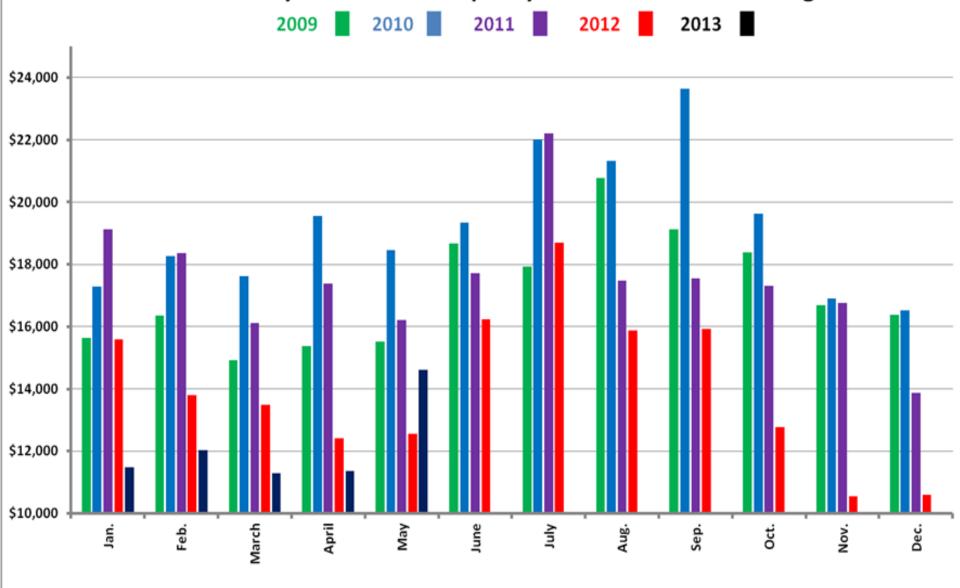
**Energy In-Site Report** 

Display a graph containing hourly average and peak demand concurrently. Provides the ability to display a stacked bar chart representing each meter's contribution to the site's average demand. See a chart detailing each meter's contribution to the site's average demand.

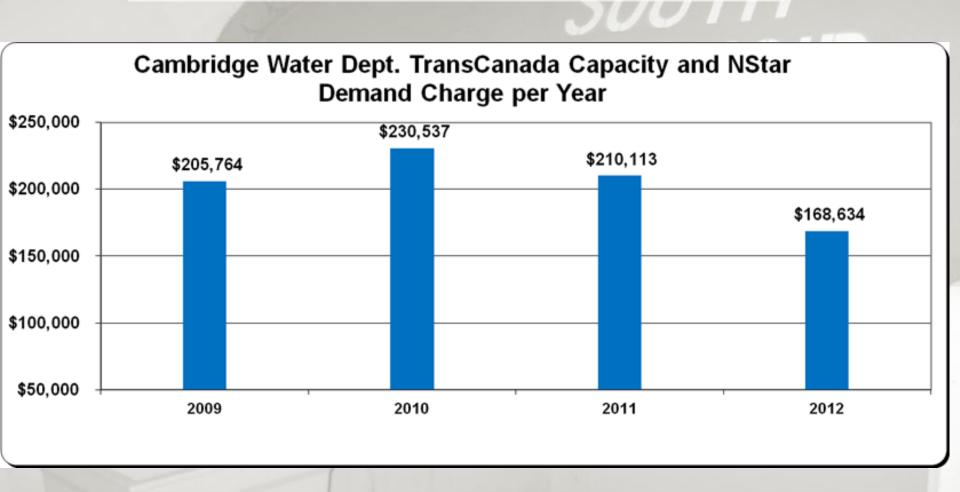




# Cambridge Water Department Monthly TransCanada Capacity and NStar Demand Charge



# Dollar Savings - \$61,903 - in the TransCanada and NSTAR Capacity/Demand Charges since 2010



**Cambridge** was one of 35 cities and towns to be officially designated as a "Green Community" under the first round of a state program



To be designated, the City adopted 5 required criteria, including adoption of the **Stretch Energy Code**, and development of an **Energy Reduction Plan** for reducing energy consumption by 20%.

Established under the MA Green Communities Act of 2008, the Green Communities Program is administered by the MA Department of Energy Resources (DOER) and provides funding to help municipalities pursue energy efficiency measures...



### **Summary – GO GREEN**

If your facility is so equipped, submetering brings an operational awareness of where the biggest cost savings can be had for little or no money.

There are no cost options to reduce energy costs:

- •Being aware of peak electrical cost periods, i.e. 9am 6pm in summer and 4pm 9pm in fall/winter and not operating heavy electrical loads where practical.
- •Reducing Heating and Cooling costs by operating in a larger temperature band.
- •Shutting of lights when not in use. Shutting down computers and peripherals when not in use.

For a moderate upfront cost, there are options to gain a large measure of efficiency:

- More efficient lighting
- More efficient heating and cooling.

